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Martin et al.

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(54) **RAIL CAR UNLOADING CATCH PAN SYSTEM**

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(51) **Int. Cl.**
B65D 1/34 (2006.01)
B65D 21/024 (2006.01)

(52) **U.S. Cl.**
CPC ***B65D 1/34*** (2013.01)

(58) **Field of Classification Search**
CPC B65D 90/24; F16N 31/006; F16N 31/002
USPC 220/571, 573, 23.4
See application file for complete search history.

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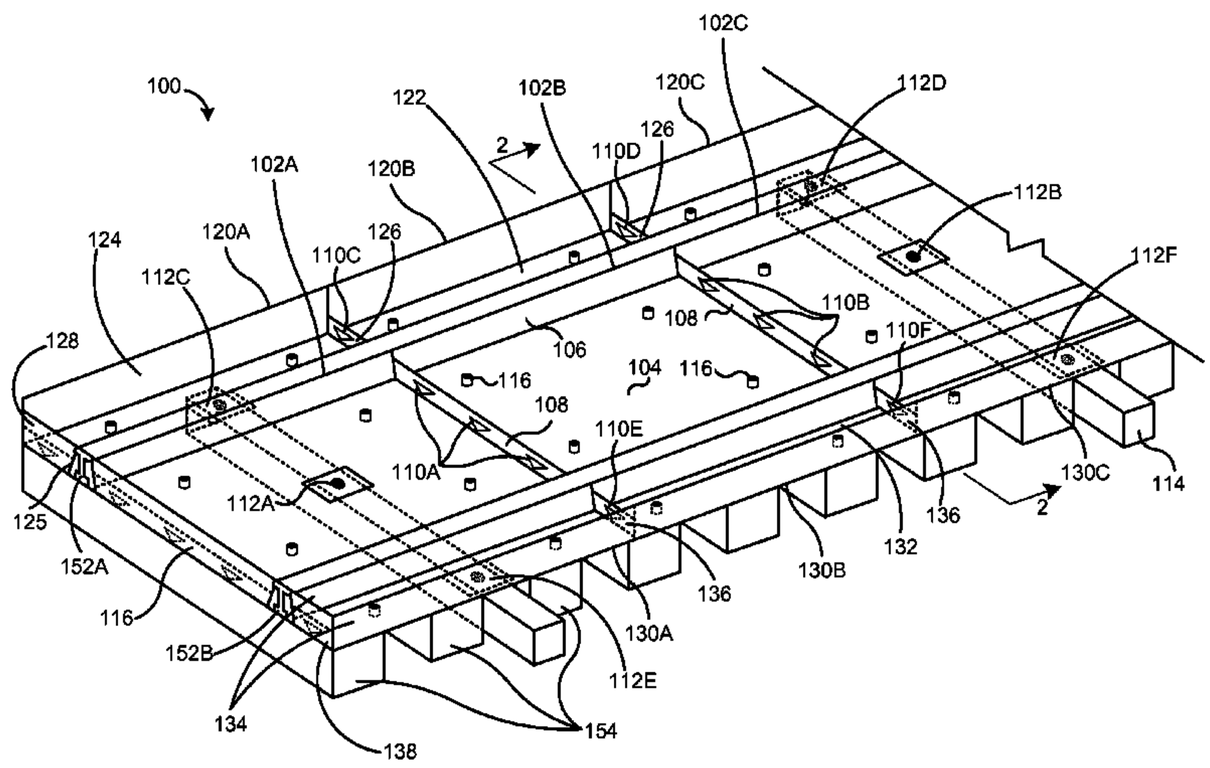
(57) **ABSTRACT**

A system for catching and containing a spill of a liquid from a rail tank car consisting of a series of catch pans attached end-to-end and placed between the rails of a railroad track is provided. The end walls of each catch pan are shorter than its side walls, with the catch pans located at either end of the series having an end wall extension attached to raise the height of the end wall to that of the side walls. A sealing gasket is placed between adjacent catch pans, and at least one opening extends through the end walls and the sealing gasket between adjacent catch pans. A drain is located in the bottom of at least one of the catch pans.

20 Claims, 7 Drawing Sheets



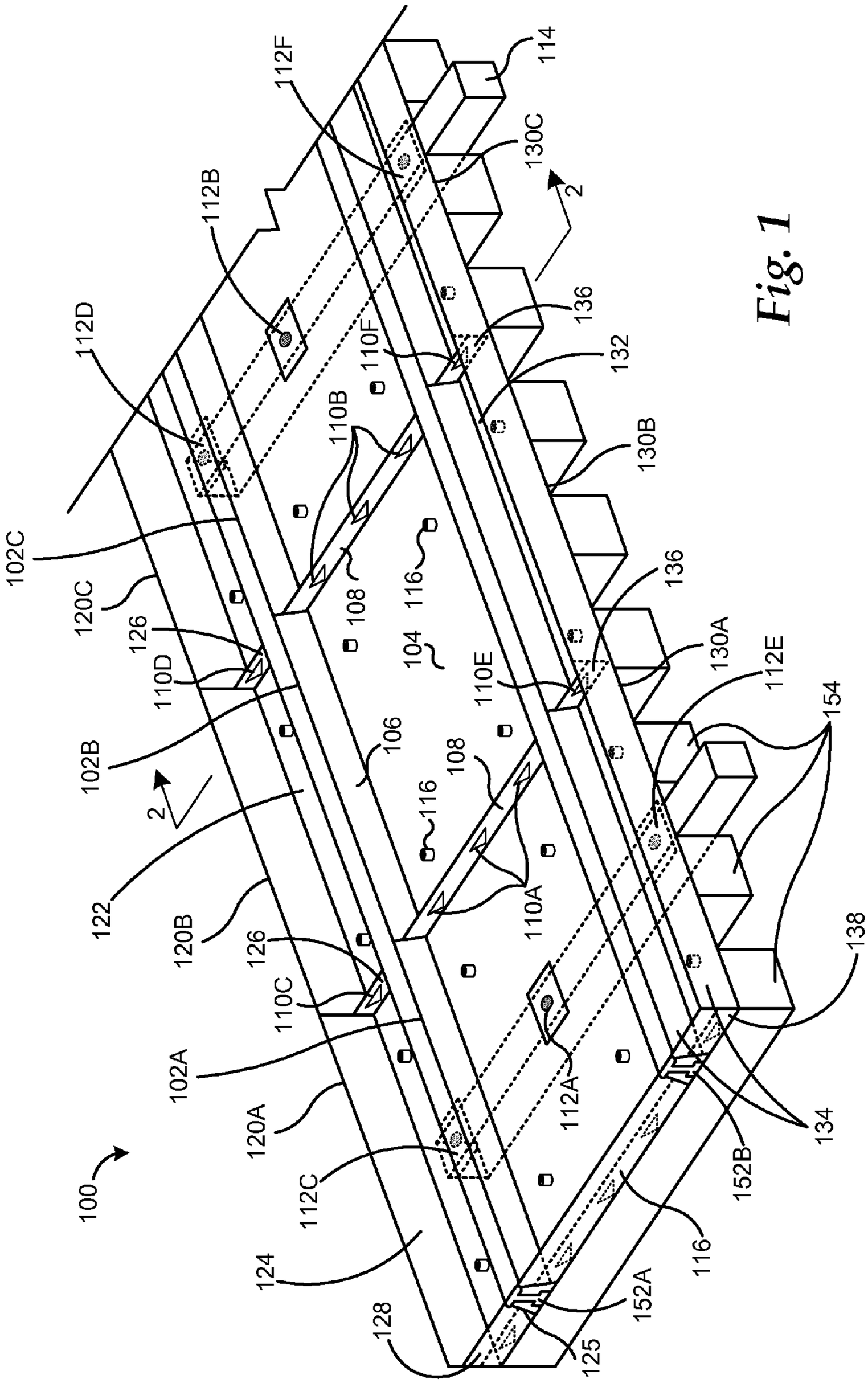

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Fig. 1

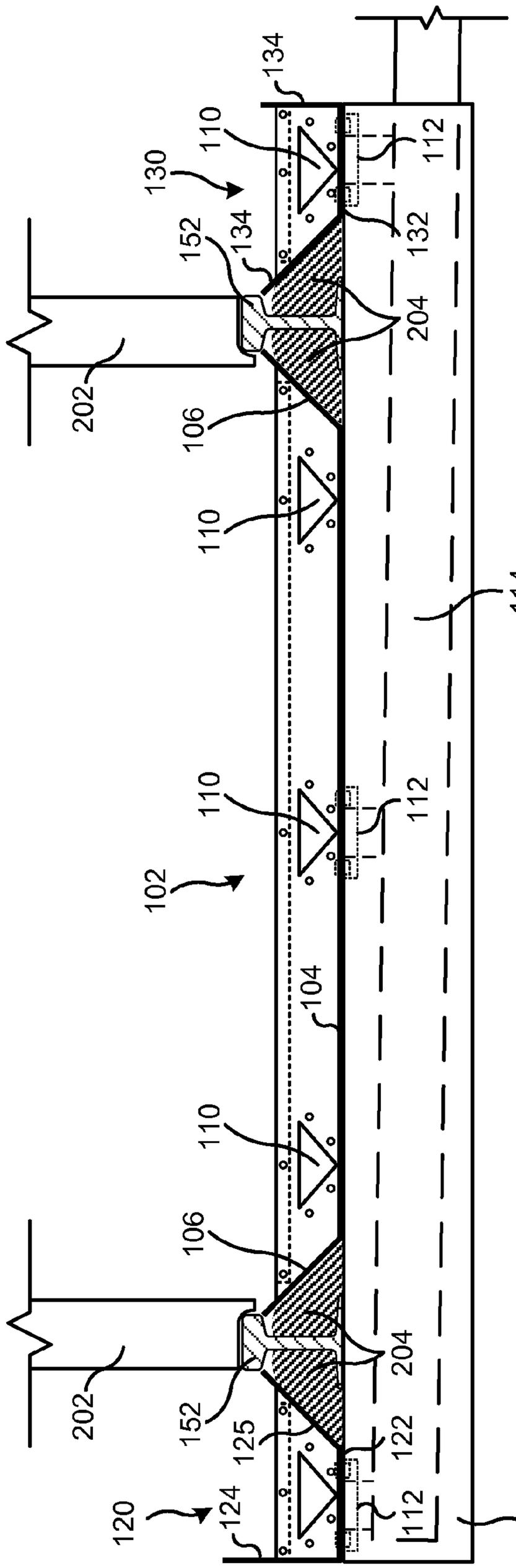
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Fig. 2

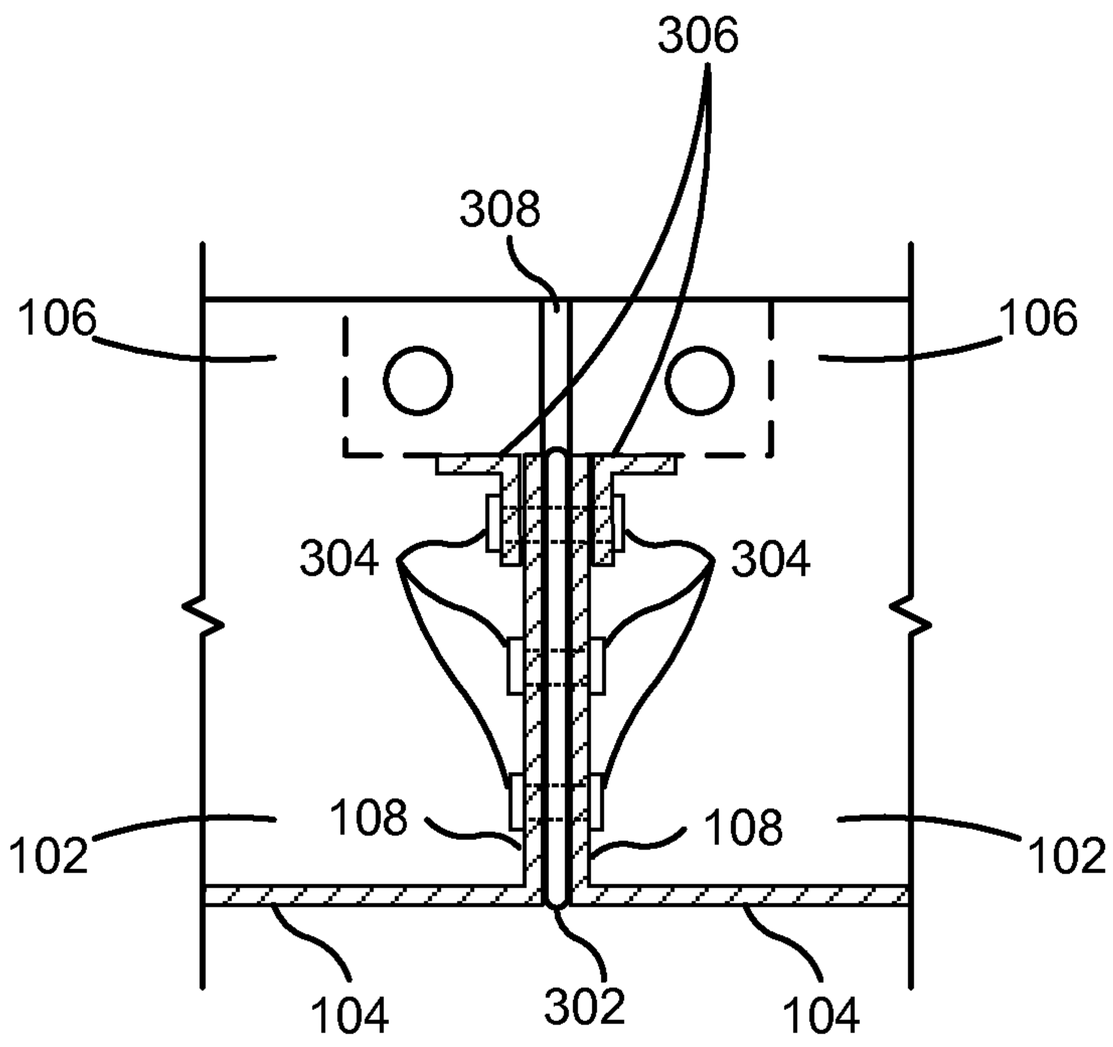

Fig. 3

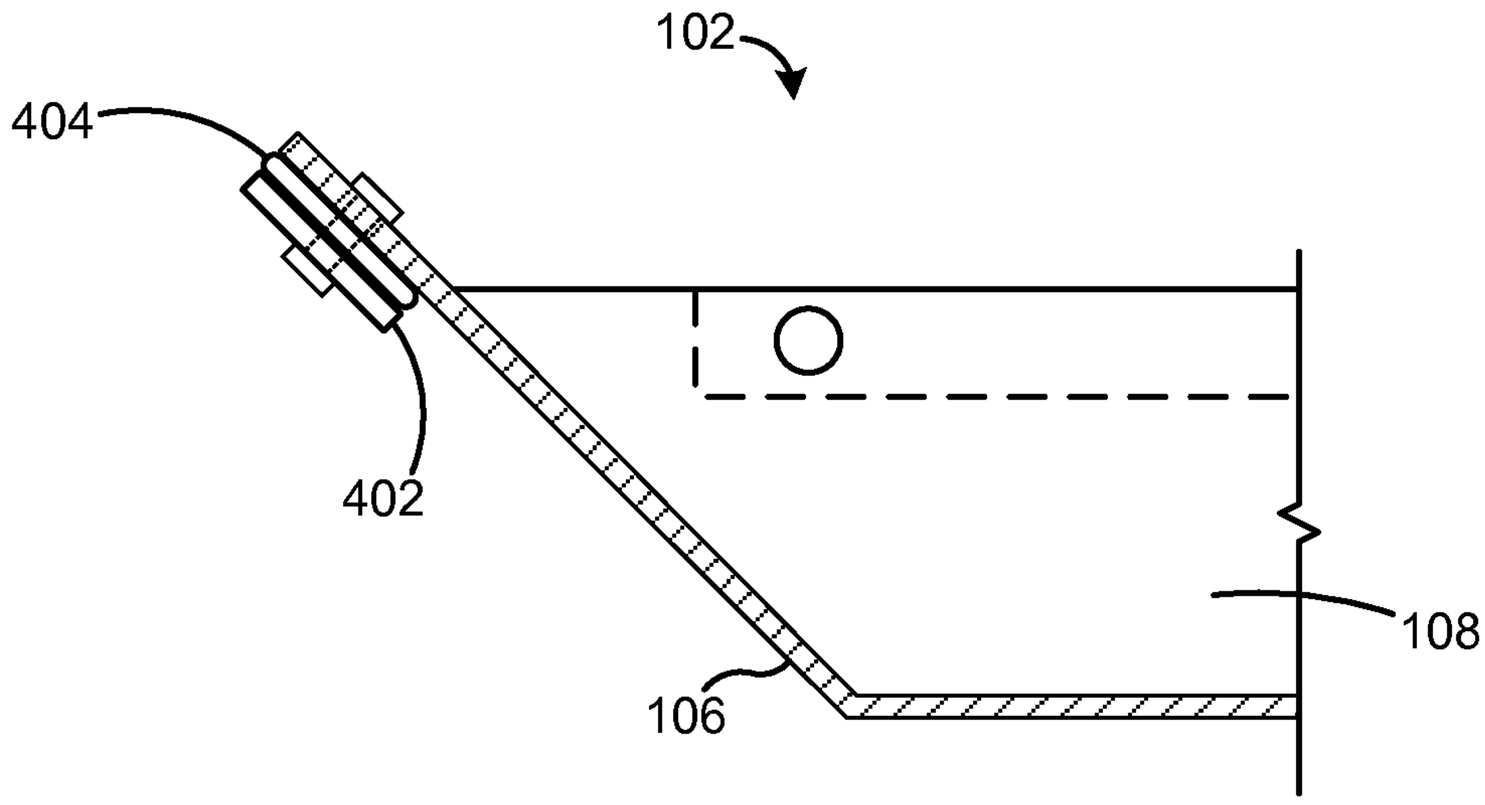

Fig. 4

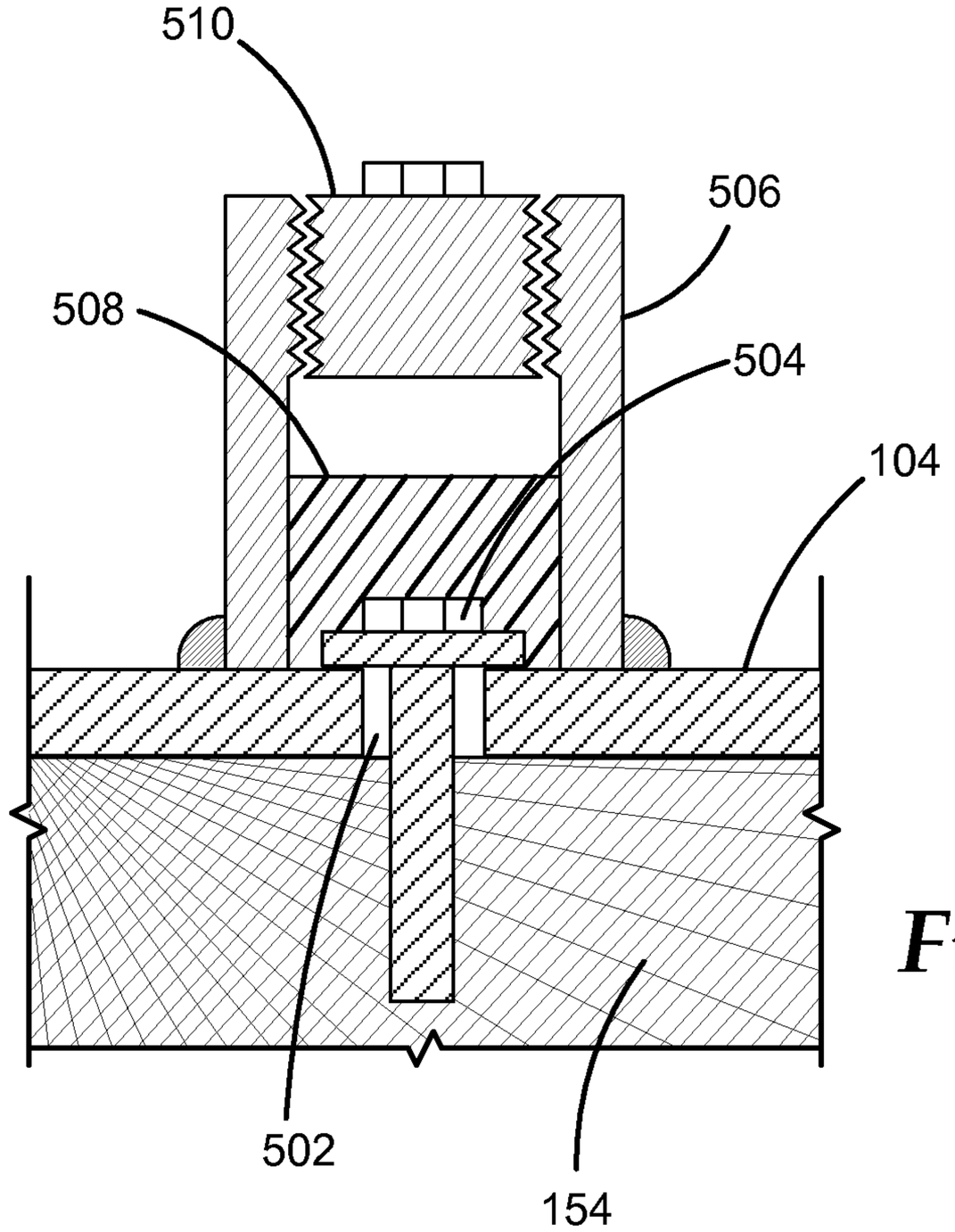

Fig. 5

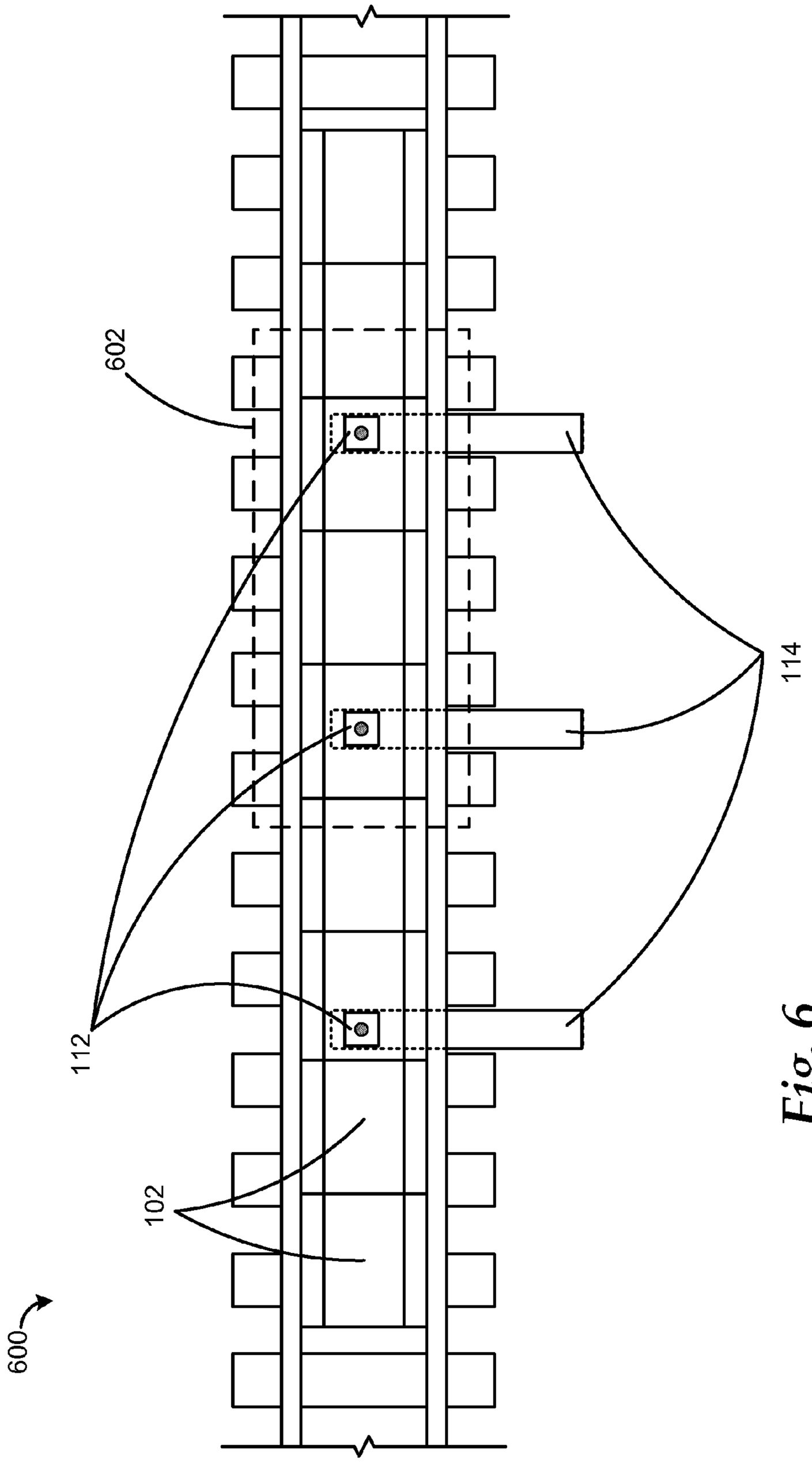

Fig. 6

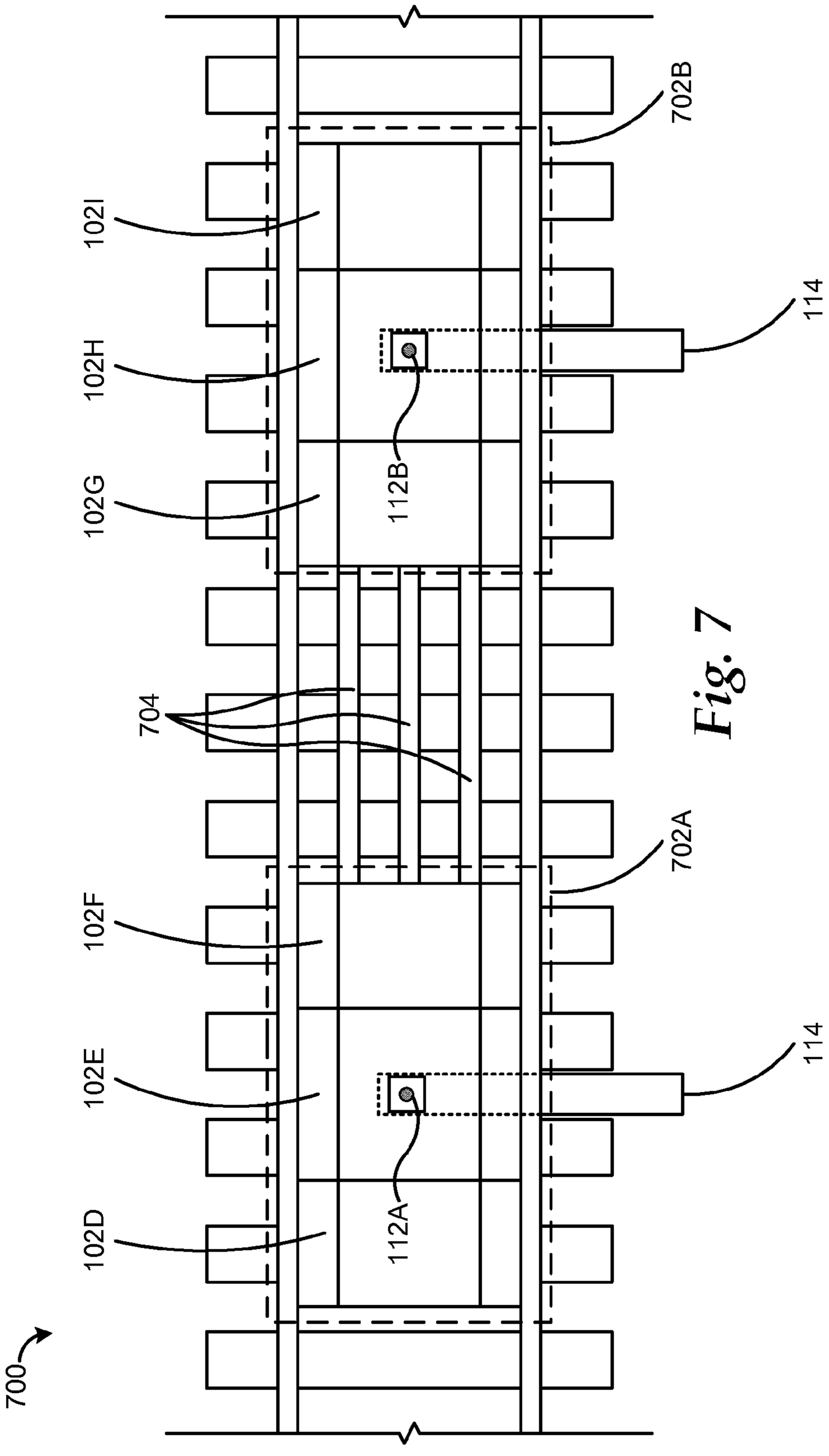

Fig. 7

RAIL CAR UNLOADING CATCH PAN SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation of and claims priority to U.S. patent application Ser. No. 12/100,440, entitled "Rail Car Unloading Catch Pan Systems," filed on Apr. 10, 2008, now U.S. Pat. No. 8,499,962, which is incorporated herein by reference in its entirety.

BACKGROUND

An industrial railroad siding where hazardous chemicals are loaded and unloaded from rail tank cars presents an environmental concern, in that an accidental spill of some or all of the contents of the rail tank car can occur. Typically, such spills can be divided into "nuisance spills," where a small quantity of chemicals escape the tank car during the connection or disconnection of hoses or from leaks in the hoses of the unloading system, and "catastrophic spills," where a hose ruptures or valve or coupling gives way and the entire contents of the tank car are released. A rail tank car may contain from 16,000 to 40,000 gallons of chemical and may have up to a 5" or larger discharge opening. In the event of a catastrophic spill, this volume of chemical may be rapidly released onto the rail bed and could quickly find its way into nearby streams or ground water. This could result in significant environmental damage, a costly cleanup, and stiff regulatory fines.

A common precaution in these situations is to install a containment system underneath the rail tank cars to capture any liquids spilled during loading and unloading, such as a series of catch pans installed on the rail bed between the rails of the siding. Typical catch pan systems, while perhaps adequate to contain most nuisance spills, cannot safely contain a catastrophic spill of a hazardous chemical. Typical catch pan system designs generally require each pan to have its own means for drainage, and these drains are usually not sufficiently large to handle the volume and rate of liquid being discharged from the typical discharge opening of a tank car, such as a 5" discharge opening. If the drain for a particular pan becomes blocked or overwhelmed by the flow rate liquid, the pan can quickly fill and potentially overflow onto the rail bed underneath.

SUMMARY

It should be appreciated that this Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended for use in limiting the scope of the claimed subject matter.

Apparatus and systems are described herein for catching and containing a spill of a liquid from a rail tank car located upon a railroad siding. In one embodiment, a catch pan system consists of a series of catch pans, each catch pan consisting of a bottom, side walls, and end walls, with the end walls being shorter than the side walls. The catch pans are sized such that they fit between the rails of the railroad track and are attached end-to-end and further attached to the cross-ties of the railroad track. A sealing gasket is placed between adjacent catch pans and at least one opening extends through each of the end walls and the sealing gasket between adjacent catch pans. The openings are configured to be of sufficient size to handle a maximum flow rate of liquid. In one embodiment, the openings are triangular in shape with a vertex located close to the bottom of the catch pan such that liquid may flow from pan to pan immediately. A drain is located in the bottom of at least one of the catch pans and leads to a drainage apparatus capable of capturing a maximum volume of liquid. The catch pans located at either end of the series of catch pans include an end wall extension attached to the end walls configured to extend the height of the end wall to that of the side walls.

According to further embodiments, the system additionally consists of a series of short side pans connected end-to-end and placed outside one of the rails, each short side pan having end walls shorter than the side walls. A sealing gasket is placed between adjacent short side pans and at least one opening extends through each of the end walls and the sealing gasket between adjacent short side pans. A drain is located in the bottom of at least one of the short side pans and leads to the drainage apparatus. In other embodiments, the system further consists of a series of tall side pans connected end-to-end and placed outside the other rail, each tall side pan having end walls shorter than the inside side wall, and having an outside side wall taller than the inside side wall. A sealing gasket is placed between adjacent tall side pans and at least one opening extends through each of the end walls and the sealing gasket between adjacent tall side pans. A drain is located in the bottom of at least one of the tall side pans and leads to the drainage apparatus. The short side and tall side pans located at either end of the series of pans include an end-wall extension attached to the end wall configured to extend the height of the end wall to that of the side walls.

Other apparatus and systems according to embodiments will be or become apparent to one with skill in the art upon review of the following drawings and Detailed Description. It is intended that all such additional apparatus and/or systems be included within this description, be within the scope of the present invention, and be protected by the accompanying claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a catch pan system installed on a railroad siding, according to various embodiments presented herein;

FIG. **2** is a cross-sectional view taken along line **2-2** of FIG. **1** showing the railroad siding with the catch pan system installed, according to various embodiments presented herein;

FIG. **3** is a cross-sectional view showing details of a method of attaching adjacent catch pans of the catch pan system, according to various embodiments presented herein;

FIG. **4** is a cross-sectional view showing further details of a method of attaching adjacent catch pans of the catch pan system, according to various embodiments presented herein;

FIG. **5** is a cross-sectional view showing details of a method of attaching the catch pans of the catch pan system to the cross-ties of the railroad siding, according to various embodiments presented herein;

FIG. **6** is a top plan view showing a representative configuration of the catch pan system on a railroad siding, according to various embodiments presented herein; and

FIG. **7** is a top plan view showing an alternative configuration of the catch pan system on a railroad siding, according to various embodiments presented herein.

DETAILED DESCRIPTION

The following detailed description is directed to a catch pan system for catching and containing a spill of a liquid from

a rail tank car located upon a railroad siding. As discussed briefly above, typical catch pan systems are generally not designed to safely contain a catastrophic spill of a hazardous chemical. Rather, these catch pan systems generally require each pan to have its own means for drainage, and these drains are usually not of a sufficient size to handle the potential 40,000 gallon volume and flow rate of a viscous chemical being discharged from up to a 5" discharge opening of a tank car. If the drain for a particular pan becomes blocked or overwhelmed by the flow rate of the chemical, the pan can quickly fill and potentially overflow onto the rail bed underneath.

However, embodiments of the disclosure provided below describe a catch pan system for catching and containing such a catastrophic spill of a hazardous chemical, consisting of a series of catch pans attached end-to-end with a sealing gasket placed between adjacent catch pans. At least one opening extends through each of the end walls and the sealing gasket between adjacent catch pans. The opening is of sufficient size to allow a liquid, such as a viscous chemical, discharged from a discharge opening of a container for retaining liquid, such as a tank car, to readily flow from pan to pan. According to exemplary embodiments, the opening is triangular in shape with a vertex located close to the bottom of the catch pan so that the chemical flows from pan to pan immediately. A drain is located in the bottom of at least one of the catch pans. The drain is of sufficient size to handle the flow of a viscous chemical discharged from the discharge opening and leads to a containment apparatus capable of containing the entire contents of a tank car.

According to exemplary embodiments, the end walls of each catch pan are shorter in height than its side walls, with the catch pans located at either end of the series of catch pans having an extension member attached that raises the height of the end wall to that of the side walls. Thus the system is configured such that chemical entering into any one catch pan can flow through the openings into adjacent catch pans or, if the openings between adjacent catch pans become blocked or overwhelmed by the flow of the chemical, the chemical in the catch pan can overflow the shorter end walls into adjacent catch pans without spilling over the side walls and onto the rail bed. In this way chemical entering into any catch pan can find its way to multiple drains located in adjacent catch pans in the system. This redundancy ensures a catastrophic spill of a hazardous chemical from a tank car can be safely caught and contained without the chemical spilling onto the rail bed and causing environmental damage.

In the following detailed description, references are made to the accompanying drawings that form a part hereof, and which are shown by way of illustration, specific embodiments, or examples. Referring now to the drawings, in which like numerals represent like elements through the several figures, aspects of a catch pan system for catching and containing a spill of a liquid from a rail tank car will be described. FIG. **1** shows a perspective view of a catch pan system **100** installed on a railroad siding, according to one embodiment. The catch pan system **100** consists of a series of center catch pans **102**A, **102**B, **102**C (generally referred to herein as center catch pans **102**), attached end-to-end and located between the rails **152**A, **152**B (generally referred to herein as rails **152**) of the railroad siding. Each center catch pan **102**A, **102**B, **102**C has a bottom **104**, two side walls **106**, and two end walls **108**. In one embodiment, the bottom **104** of each center catch pan **102**A, **102**B, **102**C rests upon the cross-ties **154** of the railroad siding and is affixed to the cross-ties **154** at various points by sealed connection members **116**, described in detail below in regard to FIG. **5**.

A drain **112**A, **112**B (generally referred to herein as drains **112**) extends through the bottom **104** of at least one center catch pan, such as center catch pan **102**C, and is connected to a drainage tube **114** which runs below the center catch pan **102**C and between adjacent cross-ties **154** of the railroad siding. According to exemplary embodiments, the size of each drain **112**A, **112**B and drainage tube **114** is sufficient to handle the maximum flow rate of a liquid from up to a 5" discharge opening of a rail tank car or any other type of container of liquids, as well as rain water entering the center catch pans **102**A, **102**B, **102**C during a rainstorm. The drains **112**A, **112**B and drainage tube **114** may further be sized to handle the maximum flow rate of a liquid from a larger or smaller discharge opening of a rail tank car or other type of container for retaining liquid. In one embodiment, the drainage tube is square in shape to maximize the cross-sectional area of the tube that can be placed between adjacent cross-ties **154**, thus maximizing the flow capacity of liquid in the drainage tube **114**. The drainage tube **114** is connected to a containment means (not shown) capable of containing the maximum contents of a rail tank car. According to exemplary embodiments, multiple center catch pans, such as the center catch pans **102**A, **102**C, within the catch pan system **100** include drains, such as the drains **112**A, **112**B, providing for redundancy.

At least one opening **110**A, **110**B (generally referred to herein as openings **110**) extends through the end walls **108** of the adjacent center catch pans **102**A, **102**B, **102**C. In accordance with exemplary embodiments, multiple openings **110**A, **110**B exist between the adjacent center catch pans **102**A, **102**B, **102**C allowing for a maximum flow of liquid between the pans. In addition, the end walls **108** of each center catch pan **102**A, **102**B, **102**C are shorter in height than the side walls **106**. In the event that the openings **110**A, **110**B between the adjacent center catch pans **102**A, **102**B, **102**C were to become blocked or overwhelmed by the flow of liquid, the liquid in the center catch pans can overflow the shorter end walls **108** into the adjacent center catch pans without spilling over the side walls **106** and onto the rail bed. Center catch pans located at either end of the series of center catch pans, such as the center catch pan **102**A, have an end plate **116** attached to their non-adjacent end walls **108** that raises the height of the end wall **108** to that of the side walls **106**, according to exemplary embodiments.

The primary effect of this configuration is that liquid entering any of the center catch pans **102**A, **102**B, **102**C may flow from pan to pan within the catch pan system **100** in order to find its way to one of a number of available drains, such as drains **112**A, **112**B. For example, as illustrated in FIG. **1**, liquid entering the center catch pan **102**B may flow through the multiple openings **110**A, or by overflowing the end walls **108** if the openings **110**A become blocked or overwhelmed, into the catch pan **102**A adjacent to the center catch pan **102**B, and into the drain **112**A located in the bottom of the center catch pan **102**A. In addition, liquid entering the center catch pan **102**B may also flow through the multiple openings **110**B, or by overflowing the end walls **108** if the openings **110**B become blocked or overwhelmed, into the center catch pan **102**C adjacent to the center catch pan **102**B, and into the drain **112**B located in the bottom of the center catch pan **112**C. By providing redundant paths through each of the center catch pan **102**A, **102**B, **102**C for liquid to flow to the multiple drains **112**A, **112**B, the catch pan system **100** ensures that a liquid entering any of the center catch pans **102**A, **102**B, **102**C can be safely contained, even if one or more of the openings **110**A, **110**B or one of the available drains **112**A, **112**B is blocked or otherwise non-functional.

In a further embodiment, the catch pan system **100** includes a series of tall side pans **120**A, **120**B, **120**C attached end-to-end and located outside one of the rails **152**A of the railroad siding. Each tall side catch pan **120**A, **120**B, **120**C has a bottom **122**, an outside side wall **124**, an inside side wall **125**, and two end walls **126**. The end walls **126** are shorter in height than the inside side wall **125**, and the outside side wall **124** is taller in height than the height of the adjacent rail **152**A. Tall side pans located at either end of the series of tall side pans, such as the tall side pan **120**A, have an end plate **128** attached to their non-adjacent end walls **126** that raises the height of the end wall **126** to that of the inside side wall **125**. Like the center catch pans **102**A, **102**B, **102**C described above, the bottom **122** of each tall side pan **120**A, **120**B, **120**C rests upon the cross-ties **154** of the railroad siding and is affixed to the cross-ties **154** at various points by the sealed connection members **116**, described in detail below in regard to FIG. **5**.

A drain **112**C, **112**D extends through the bottom **122** of a least one tall side pan, such as the tall side pan **120**C, and is connected to the drainage tube **114** which runs below the tall side pan **120**C and the center catch pan **102**C. At least one opening **110**C, **110**D extends through the end walls **126** of adjacent pans **120**A, **120**B, **120**C. Just as with the center catch pans **102**A, **102**B, **102**C described above, liquid entering into the tall side pan **120**B can flow through the openings **110**C, **110**D in the end walls **126** into adjacent tall side pans **120**A, **120**C which contain the drains **112**C, **112**D, respectively. In the event that the openings **110**C, **110**D between the adjacent tall side pans **120**A, **120**B, **120**C become blocked or overwhelmed by the flow of liquid, the liquid can overflow the shorter end walls **126** into the adjacent tall side catch pans. Further, if the drains **112**C, **112**D in the tall side pans **120**A, **120**C become blocked or otherwise non-functional, the tall, outside side wall **124** will direct the flow of liquid over the inside side wall **125** of the tall side pans **120**A, **120**B, **120**C and over the adjacent rail **152**A and into the center catch pans **102**A, **102**B, **102**C, to allow the liquid to be contained.

In addition, embodiments of the catch pan system **100** may include a series of short side pans **130**A, **130**B, **130**C attached end-to-end and located outside the opposite rail **152**B. According to exemplary embodiments, each short side pan **130**A, **130**B, **130**C has a bottom **132**, two side walls **134**, and two end walls **136**. Just as in the other catch pans **102**A-**102**C, **120**A-**120**B described above, the end walls **136** are shorter in height than the side walls **134**, and short side pans located at either end of the series of short side pans, such as the short side pan **130**A, have an end plate **138** attached to their non-adjacent end walls **136** that raises the height of the end wall **136** to that of the side walls **134**. A drain **112**E, **112**F extends through the bottom **132** of at least one short side pan, such as short side pan **130**C, and is connected to the drainage tube **114**. At least one opening **110**E, **110**F extends through the end walls **136** of the adjacent pans **130**A, **130**B, **130**C. Although the center catch pans **102**A, **102**B, **102**C alone are adequate to contain the maximum flow rates discussed herein, the addition of the short side pans **130**A, **103**B, **130**C and tall side pans **120**A, **120**B, **120**C provide additional coverage area for capturing leaks and spills of liquid on the railroad siding, as well as redundant containment mechanisms in the event that the center catch pan drains **112**A, **112**B become blocked, and the liquid overflows the rails **152**A, **152**B into the short side pans **130**A, **130**B, **130**C and tall side pans **120**A, **120**B, **120**C.

In one embodiment, the catch pans **102**A-**102**C, **120**A-**120**B, **130**A-**130**C are made of carbon steel and lined with epoxy in order to resist corrosion and be substantially impervious to caustic chemicals. Each catch pan **102**A-**102**C, **120**A-**120**B, **130**A-**130**C may be constructed up to 9 feet in length, allowing each pan to be cut and manufactured from a single, standard 5'×10' sheet of steel, in accordance with exemplary embodiments. It should be appreciated, however, that the pans can be manufactured from any number of materials and in any size depending upon the type of liquid being contained and other factors.

Turning now to FIG. **2**, further details of the catch pan system **100**, according to various embodiments presented herein will be described. FIG. **2** shows a cross-sectional view, taken generally along line **2**-**2** of FIG. **1**, of the tall side pan **120**, center catch pan **102**, and short side pan **130** installed upon the cross-ties **154** of the railroad siding. The side walls **106** of the center catch pan **102** rise from the bottom **104** at an angle such that the top width of the center catch pan **102** is wider than the width of the bottom **104**. In one embodiment, the angle of the side walls **106** to the bottom **104** is 135 degrees. This shape allows the bottom **104** of the center catch pan **102** to be positioned directly on the cross-ties **154** of the railroad siding between the foot and attachment means of each of the pair of rails **152**, with the top of the side walls **106** positioned close to the head of the rails **152** but clear of wheels **202** of a rail tank car as is it travels along the railroad siding.

The space or gap between the center catch pan **102** and the adjacent rails **152** is filled with a gap filler material **204**, such that liquid spilled directly upon the rail or overflowing the rail from the center catch pan **102** to the tall side pan **120** or short side pan **130** does not flow onto rail bed of the railroad siding. In one embodiment, the gap filler material **204** is a synthetic resin or polyurethane foam that can be easily introduced into the gap as a liquid but will expand and harden to form a resilient and impervious barrier. It will be appreciated by one of ordinary skill in the art that the choice of the gap filler material **204** will depend upon a number of factors, including the types of liquids or chemicals with which the material is likely to come into contact, the stability of the rail bed on which the railroad siding lies, and the climate of the area where the railroad siding is located.

In exemplary embodiments, the multiple openings **110** are located in the end walls **108** of the center catch pan **102**. Each opening **110** is sized to provide for a maximum flow of liquid from pan to pan. In one embodiment, each opening **110** is sized to provide an open area greater than that of a 4" pipe drain. In a further embodiment, the openings **110** are triangular in shape with the widest width towards the top of the end wall **108**, and an opposite vertex located nearly flush with the bottom **104** of the center catch pan **102**. This configuration provides an opening **110** with the greatest area while minimizing the width of the opening close to the bottom **104** of the pan **102**, where the gasket between the center catch pans is the thinnest, as described in more detail below. In addition, by placing the openings **110** nearly flush with the bottom **104** of the center catch pan **102**, liquid entering the center catch pan **102** can flow to the adjacent catch pans immediately. This eliminates the build-up of "nuisance liquid" in the bottom of the pan **102** which could become trapped and have to be removed by means of a pump or other external method. It will be appreciated by one of ordinary skill in the art that the openings **110** may take any shape which immediately allows a liquid entering one of the pans **102** to flow into adjacent catch pans.

The tall side pan **120** and short side pan **130** are similarly shaped, with their respective side walls **125**, **134** located adjacent to the rail **152** rising at a 135 degrees angle from the bottom **122**, **132** in order to be positioned directly on the cross-ties **154** of the railroad siding clear of the foot and attachment means of the rail **152**, with the top of the side wall **125**, **134** positioned close to head of the rail **152**. The gap

between the tall side pan **120** or short side pan **130** and the adjacent rail **152** is filled with the gap filler material **204**, as described above. The openings **110** in the tall side pan **120** and short side pan **130** are similarly shaped and positioned as those of the center catch pan **102**, as described above. However, it will be appreciated by one of ordinary skill in the art that the openings **110** may take any shape which immediately allows a liquid entering one of the pans **120**, **130** to flow into adjacent catch pans. It will be further appreciated that, while FIG. **2** illustrates the center catch pan **102** having three openings **110** and the tall side pan **120** and short side pan **130** each having one opening **110**, any number of openings **110** may be provided allowing sufficient flow of liquid between adjacent pans.

As further illustrated in FIG. **2**, the drains **112** located in the bottoms **122**, **104**, **132** of the tall side pan **120**, center catch pan **102**, and short side pan **130**, respectively, are attached to the drainage tube **114** which runs underneath the pans between the adjacent cross-ties **154** of the railroad siding. In one embodiment, the drainage tube **114** is pitched downward as the tube runs from the tall side pan **120** under the center catch pan **102** and the short side pan **130**, with the lower end being attached to the containment means.

FIG. **3** illustrates a means of attaching the adjacent center catch pans **102** of the catch pan system **100**, according to exemplary embodiments. Two center catch pans **102** are attached end-to-end, with a gasket **302** placed between the adjacent end walls **108**. The gasket **302** covers the full area of the end wall **108** and, in one embodiment, is made of ⅛" red silicon rubber. It will be appreciated, however, that the gasket material may vary depending on a number of factors, including the types of liquids or chemicals with which the gasket **302** is likely to come into contact and the climate of the area where the railroad siding is located. The openings **110** between adjacent center catch pans **102** pass through the gasket **302**. Multiple connection members **304** attach the adjacent center catch pans **102** together, and pass through the end walls **108** of the adjacent catch pans as well as the gasket **302**. Connection members **304** may consist of hex bolts and nuts, allowing the pans **102** to be disassembled to replace a damaged pan or to service the railroad siding underneath. In one embodiment, the top connection members **304** also attach a support angle bracket **306** on the inside of each end wall **108**. The support angle bracket **306** provides support for optional bar grating (not shown) which may be placed over each catch pan **102**, **120**, **130** in the catch pan system **100**.

An area **308** between the side walls **106** of the adjacent center catch pans **102** above the end walls **108** is covered by a splice plate **402** and a gasket **404** of the same size, as shown FIG. **4**. According to exemplary embodiments, the gasket **404** is made of ⅛" red silicon rubber. The splice plate **402** and gasket **404** prevent liquid from leaking outside of the adjacent center catch pans **102** in the event the liquid overflows the shorter end walls **108**. Further, the means of attaching adjacent tall side pans **120** and adjacent short side pans **130** is substantially the same as the means of attaching center catch pans **102**, as described in regard to FIGS. **3** and **4**.

FIG. **5** illustrates the sealed connection member **116** used to attach a catch pan, such as the center catch pan **102**, to the underlying cross-tie **154**, according to one embodiment. Each catch pan **102**, **120**, **130** is attached to an underlying cross-tie **154** at various points by passing a lag bolt **504** through a hole **502** in the bottom **104** of the catch pan **102** and into the cross-tie **154**. In order to prevent liquid from leaking from the bottom **104** of the catch pan **102** through the hole **502**, the hole **502** and lag bolt **504** are surrounded by a pipe coupling **506** welded to the bottom **104** of the pan **102**. The pipe coupling **506** is sealed with a plug **510**. In another embodiment, the inside of the pipe coupling **506** is filled with a synthetic resin or polyurethane foam **508** to act as a further barrier to liquid escaping the catch pan **102** through the hole **502**.

This method of attaching the catch pans **102**, **120**, **130** of the catch pan system **100** to the underlying cross-ties **154** of the railroad siding allows the catch pans to be removed in the event that maintenance to the railroad siding is required, without damaging the catch pans or the siding. However, it will be obvious to one of ordinary skill in the art that other methods of attaching the catch pans **102**, **120**, **130** to the underlying cross-ties **154** could be used, including adhesive.

FIG. **6** illustrates a representative configuration **600** of the catch pan system **100**, according to various embodiments presented herein. The depicted configuration **600** consists of nine center catch pans **102** connected together as described above, covering the entire loading/unloading area of the railroad siding. Three of the center catch pans **102** include the drains **112**, which connect through the drainage tubes **114** to a containment means capable of holding the entire contents of a rail tank car, such as a lined retaining ditch or holding tank. A spill of a liquid from a rail tank car, depicted by a box **602**, located anywhere on the siding would be caught by one of the underlying center catch pans **102** and would flow from catch pan to catch pan and into one or more of the drains **112** included in the configuration **600**. This representative configuration provides the capacity and redundancy to ensure that any catastrophic spill of the entire contents of a rail tank car could be caught and contained, and thus would allow for the safe, un-attended loading or unloading of rail tank cars on the railroad siding.

An alternative configuration **700** of the catch pan system **100** is illustrated in FIG. **7**. This configuration **700** consists of two sets of three center catch pans **102**D-**102**F and **102**G-**102**I. The center catch pan **102**E, **102**H in each set of three includes a drain **112**, which connects through the drainage tube **114** to the containment. Between the two sets of center catch pans **102**D-**102**F and **102**G-**102**I are three pipes **704**, each connecting one of the openings **110** in the inside center catch pan of the first set **102**F to the opposing opening **110** in the inside center catch pan of the second set **102**G. Although three pipes **704** are illustrated, the number of pipes will depend on the number of openings **110**. The configuration **700** illustrated in FIG. **7** provides coverage for two positions for the loading/unloading of rail tank cars, represented by blocks **702**A and **702**B, while requiring only six center catch pans **102**D-**102**F and **102**G-**102**I and two drains **112**. This configuration has the advantage of reduced cost of installation while maintaining the capability and redundancy to handle a catastrophic spill of a liquid from a rail tank car. Many more configurations, including combinations of the center catch pans **102**, tall side pans **120**, and short side pans **130** can be imagined by one of ordinary skill in the art, depending on the length of the railroad siding, the number of rail tank cars to be loaded or unloaded, the budget for the installation, etc.

The subject matter described above is provided by way of illustration only and should not be construed as limiting. Various modifications and changes may be made to the subject matter described herein without following the example embodiments and applications illustrated and described, and without departing from the true spirit and scope of the present invention, which is set forth in the following claims.

We claim:

1. A catch pan system comprising:

a first catch pan having a first bottom and a first plurality of walls at a perimeter of the first catch pan;

a second catch pan having a second bottom and a second plurality of walls at a perimeter of the second catch pan, wherein a first end wall of the first plurality of walls is shorter than side walls of the first plurality of walls to allow a liquid in the first catch pan to flow into the second catch pan, each of the side walls being planar and extending from the first bottom to a point above the first end wall; and

a substantially triangular opening in the first end wall of the first plurality of walls, wherein the substantially triangular opening allows the liquid to flow from the first catch pan.

2. The catch pan system of claim **1**, wherein the second catch pan is attached to the first catch pan.

3. The catch pan system of claim **1**, further comprising an opening in a second end wall of the second plurality of walls, wherein the opening allows the liquid to flow into a third catch pan located adjacent to the second catch pan.

4. The catch pan system of claim **1**, wherein the first plurality of walls comprises:

the side walls;

the first end wall; and

a second end wall opposite the first end wall.

5. The catch pan system of claim **4**, wherein the side walls comprise a first side wall and a second side wall, and wherein a distance between the first side wall and the second side wall is substantially equivalent to a distance between two rails of a railroad track.

6. The catch pan system of claim **1**, wherein a widest side of the substantially triangular opening is positioned proximate to a top of the first end wall, and wherein a vertex of the substantially triangular opening is positioned proximate to a bottom of the first end wall.

7. The catch pan system of claim **1**, further comprising a means for affixing the first bottom of the first catch pan to a cross-tie of a railroad track.

8. The catch pan system of claim **7**, wherein the means for affixing comprises:

an aperture in the first bottom of the first catch pan;

a tubular member with a bottom end affixed to the first bottom of the first catch pan and a top end, the tubular member enclosing the aperture; and

a sealing member configured to seal the top end of the tubular member.

9. A catch pan system comprising:

a first catch pan having a first bottom and a first plurality of walls at a perimeter of the first catch pan, the first plurality of walls comprising a first side wall, a second side wall, a first end wall, and a second end wall, wherein the first side wall is planar and extends from the first bottom to a first point above the first end wall, and wherein the second side wall is planar and extends from the first bottom to a second point above the first end wall;

a second catch pan located adjacent to the first catch pan; and

a substantially triangular opening in the first end wall of the first plurality of walls, wherein the substantially triangular opening allows a liquid to flow from the first catch pan.

10. The catch pan system of claim **9**, wherein the first catch pan is attached to the second catch pan.

11. The catch pan system of claim **9**, wherein a distance between the first side wall and the second side wall is substantially equivalent to a distance between a pair of rails of a railroad track.

12. The catch pan system of claim **9**, wherein the first catch pan is formed from a first single sheet of material, and wherein the second catch pan is formed from a second single sheet of material.

13. The catch pan system of claim **9**, further comprising:

a sealing member between the first catch pan and the second catch pan.

14. A catch pan system comprising:

a first catch pan comprising a bottom, a first end wall, a second end wall, a first side wall that is planar and extends from the bottom to a first point above the first end wall, and a second side wall that is planar and extends from the bottom to a second point above the first end wall;

a second catch pan located adjacent to the first catch pan;

a sealing member located between the first catch pan and the second catch pan;

a substantially triangular opening in the first end wall, wherein the substantially triangular opening allows a liquid to flow from the first catch pan; and

a drain formed in the second catch pan to allow the liquid to drain from the second catch pan.

15. The catch pan system of claim **14**, wherein the first catch pan is attached to the second catch pan by a connecting member.

16. The catch pan system of claim **14**, wherein the drain is connected to a liquid containment means.

17. The catch pan system of claim **14**, wherein at least one of the first catch pan or the second catch pan is fastened to at least one of a plurality of cross-ties of a railroad track.

18. The catch pan system of claim **14**, further comprising a means for affixing the first catch pan to a cross-tie of a railroad track.

19. The catch pan system of claim **18**, wherein the means for affixing comprises:

an aperture in the bottom of the first catch pan;

a tubular member with a bottom end affixed to the bottom of the first catch pan and a top end, the tubular member enclosing the aperture; and

a further sealing member configured to seal the top end of the tubular member.

20. The catch pan system of claim **14**, wherein a vertex of the substantially triangular opening is positioned proximate to a bottom of the first end wall.

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